

## Grade 9 - Examples

Evaluate:

a)  $(2x^2 - 3x + 1) + (x^2 - x - 4)$

$$= 2x^2 - 3x + 1 + x^2 - x - 4$$

$$= 2x^2 + x^2 - 3x - x + 1 - 4$$

$$= 3x^2 - 4x - 3$$

b)  $-(3 - 2x)$

$$= -3 + 2x$$

c)  $-2(x^2 + 2x - 3)$

$$= -2x^2 - 4x + 6$$

d)  $(2x^2 - 2x - 3) - (x^2 - 4x + 2)$

$$= 2x^2 - 2x - 3 - x^2 + 4x - 2$$

$$= 2x^2 - x^2 - 2x + 4x - 3 - 2$$

$$= x^2 + 2x - 5$$

## 3.4 Expanding and factoring Algebraic Expressions

- Use the base 10 blocks to show  $2 \times 3 = 6$

- Now use the base 10 blocks to show  $12 \times 13 = 156$

- In your models of  $2 \times 3 = 6$  and  $12 \times 13 = 156$ , what do each of the following represent?

2: side  
 3: side  
 6: area

12: side  
 13: side  
 Answer: area

- Use the base 10 blocks to find the answers to  $15 \times 17 = 255$  and  $14 \times 18 = 252$
- Can you now find the answer to  $27 \times 34$ ?
- What are the limitations of base 10 blocks?
- Can you represent  $15 \times 17$  by a drawing instead of using the base 10 blocks?
- Now try finding the answer to  $25 \times 13$  by drawing an area model.

Recall: Multiplying two linear terms together forms an area.

We can often represent this multiplication using algebra tiles.

Algebra tiles for  $(x+2)(x+3)$ . The tiles are arranged in a rectangle with a central  $x^2$  tile, two  $x$  tiles on the left, three  $x$  tiles on the top, and six  $1$  tiles in the corners.

Algebra tiles for  $(-x+2)(-x+3)$ . The tiles are arranged in a rectangle with a central  $-x^2$  tile, two  $-x$  tiles on the left, three  $-x$  tiles on the top, and six  $-1$  tiles in the corners.

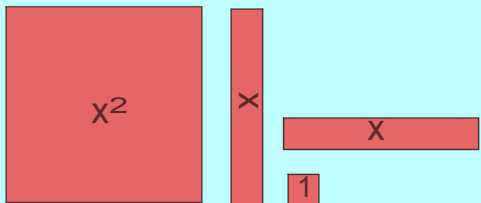
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Evaluate:  $(x + 2)(x + 3)$

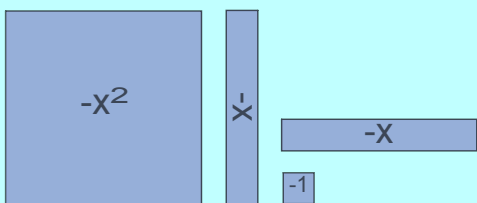
Hand-drawn algebra tile diagram for  $(x+2)(x+3)$ . The tiles are arranged in a rectangle with a central  $x^2$  tile, two  $x$  tiles on the left, three  $x$  tiles on the top, and six  $1$  tiles in the corners.

$x^2 + 5x + 6$

	$x$	$3$
$x$	$x^2$	$3x$
$2$	$2x$	$6$



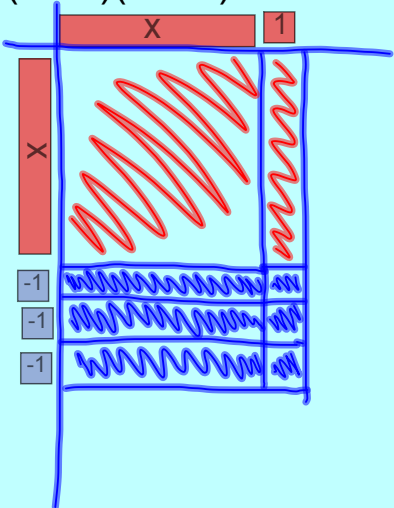
$x^2$   $x$   $x$   $1$



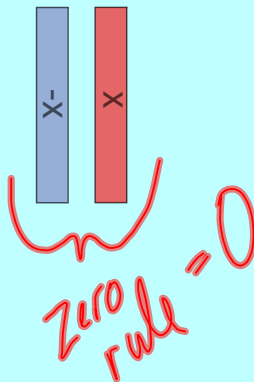
$-x^2$   $-x$   $-x$   $-1$

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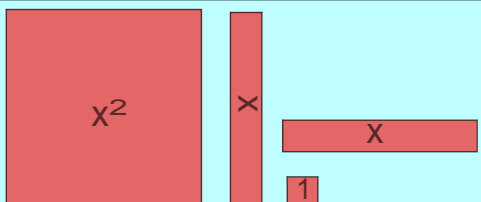
Evaluate:  $(x - 3)(x + 1)$



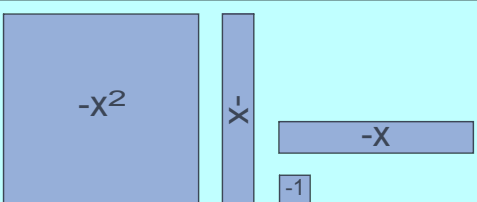
$x^2 - 2x - 3$



zero rule = 0



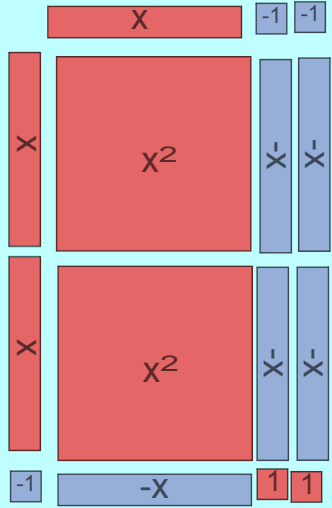
$x^2$   $x$   $x$   $1$



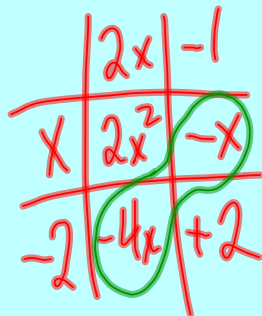
$-x^2$   $-x$   $-x$   $-1$

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Evaluate:  $(2x - 1)(x - 2)$



$2x^2 - 5x + 2$



Red tiles:  $x^2$ ,  $x$ ,  $1$

Blue tiles:  $-x^2$ ,  $-x$ ,  $-1$

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Evaluate:  $(2x - 1)(4 - x)$

$-2x^2 + 9x - 4$

	$2x$	$-1$
$-x$		
$4$		

Red tiles:  $x^2$ ,  $x$ ,  $1$

Blue tiles:  $-x^2$ ,  $-x$ ,  $-1$

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Evaluate:  $(x + y)(2x - y)$

$2xy - 1xy$

	$2x$	$-y$
$x$	$2x^2$	$-xy$
$y$	$2xy$	$-y^2$

$2x^2 + xy - y^2$

